Design Standards Brief
Section 11 – Audio Visual

Issue 6

2009
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11.1 INTRODUCTION

The Audio Visual Services department is part of RMIT’s ITS group. The Audio Visual Services department provides consultancy, project support and ongoing technical support for the Audio Visual (AV) facilities in auditoriums, video conferencing facilities, meeting rooms and teaching spaces throughout RMIT.

The department also provides specialists installations in custom spaces such as 360-degree theatres, 3D imaging installations and the like.

The AV Services department is consulted in the design and development of AV installations in new and refurbished spaces.

11.2 ROOM CLASSIFICATION

RMIT has established a standard format for its teaching spaces AV facilities. Venues with AV support devices are classified AV-0 through AV-5, depending on the level of AV enrichment present in the room. The letter C, designating “collaborative style” after AV-4, is used for collaborative teaching spaces.

The description of the classifications is as follows:

**AV0:** No equipment permanently installed. AV equipment can be requested for temporary use.

**AV1:** The simplest of the AV enriched spaces which includes a large format LCD Screen with a PC patch plate for connection and display of Laptop or PC, and an auxiliary input plate for composite video with audio for portable devices such as DVD/VHS players and iPods. The room’s AV equipment and source selection are controlled by an eight-button AMX controller. An AMX Novara series is to be located on the wall or lectern, depending on space available.

**AV2:** Ceiling mounted data projector with the ability to view a laptop, DVD/VCR, document camera, portable media player and an RMIT supplied PC. Integrated touch screen control system for easy user management. The AV 2 system is scaleable to suit rooms with or without lecterns and able to easily integrate an interactive white board.

**AV3:** Ceiling mounted data projector with the ability to view a laptop, DVD/VCR, document camera, portable media player and an RMIT supplied PC. Integrated touch screen control system for easy user management. The AV3 system also has an interactive white board, assignable audio/video patch and a USB hub/card reader. The AV 3 standard is equipped with a Lectopia lecture capturing device complete with microphones and digitizer.

**AV4:** The AV-4 standard of system will be located in RMIT’s large format lecture theatres. It has all the functionality of the AV 3 but has been scaled up to suit the larger environment. There is a larger projector and screen and there is also
more vocal support for the presenters. Located at the lectern there is a
document camera, RMIT supplied PC, Laptop input, DVD/VCR and USB
hub/Card reader. These theatres are all Lectopia equipped and support
expansions via patching panel on the front of the lectern. A standard white
board is available. Due to the size of the lecture theatres an electronic white
board element is an option available during specification of new fit outs.

AV-4C

Collaborative style classrooms are by nature custom areas and require some
basic modifications to the AV standard such as multiple displays and student
patch point enrichment to foster group interaction. The collaborative teaching
space experience will make up an increasing number of the teaching spaces
however due to location drive AV requirements each collaborative space is
considered custom at this stage. The standard of the bas facilities however
stays the same as listed under AV4. The letter “C” will be added to any of the
teaching spaces of AV4 standard, to designate them collaborative style. As
these spaces are individually designed based on spaces and discipline needs
no specific amount of auxiliary devices is listed but a standard base kit of parts
and control interface will be used so that standardisation, remote management
and support are maintained.

AV5:

Specialist facilities such as Video Conference rooms, 3D projection facilities or
auditoriums.

11.3 LECTERN EQUIPMENT

- Touch screen controls for all aspects of the AV facilities;
- External laptop/computer input interface suitable for DB-15 (VGA video) + 3.5” mini jack
(stereo/audio) connection;
- Two desk mounted condenser microphones;
- Room lighting control via touch panel;
- Preview monitor for all sources;
- Inbuilt computer with permanent connection to the RMIT network;
- Radio Microphone, lanyard style with lectern secured charging station;
- 15 RU equipment rack with security covers and locking mechanisms per RMIT security
specification;
- DVD/VCR player;
- Quad channel audio power amplifier to drive 100 volt line ceiling speakers and FOH
speakers;
- Front of house wall mounted loud speakers;
- DSP audio controller, feedback elimination or equivalent gain management system
- Audio & video selection switcher;
- Document Camera with high-resolution output. Unit to be adequately secured to the
lectern.
11.4 PROJECTION DEVICE:

The video projection system will be ceiling mounted in a security fitting. Device specification is location driven and so assessed on an individual basis. It must be fully controllable from the AMX system. Five low loss shielded 75 ohm coaxial cables are to be supplied to the projector for VGA signal. Each cable is to be labelled at both ends and terminated in BNC connectors and converted if required to DB-15 for input/output of devices.

Projectors mounted above 3 metres or above slanted floors must have a motorized projector dropper controlled from the venues AMX control system.

11.4.1 Projection Screen

The projection surface will cover the largest practical area of the front wall of the theatre comprising either a large format motorized AMX controlled screen or a hard flat surface painted matt white and extending from the floor to the ceiling. A moveable whiteboard system will be provided and where space allows, a combination of image projection and whiteboard.

11.5 ELECTRONIC WHITE BOARDS

The “Teamboard” brand of electronic whiteboard should be used as it is RMIT’s preferred product. The matched SANYO short throw projector utilizing the “snorkel” style wall mount that was designed for this application should be used with this product.

11.6 LIGHTING

11.6.1 Fluorescent Lighting

General room fluorescent lighting is to be switchable from a push button at the door entrances, and remotely via the AMX touch panel integrated into the lectern. Generally RMIT’s lecture theatres consist of four lighting circuits and this provides consistency throughout all RMIT’s theatres.

11.6.2 Down Lights

The lecture theatres are to be covered by an appropriate number of low voltage down lights for the students to take notes during audio visual presentations. Illumination must cover all seating but light spill onto the projection surface must be avoided. The down lights are to have brightness settings of ON, OFF, DIM 1 and DIM 2. They are to be controlled manually from the lectern control panel or automatically by the control system.

11.6.3 Spot Lights

Two narrow beam ceiling spot lights are to be provided above the lecturer’s teaching area for the illumination of computer keyboards, etc. These spots will be controlled from the lectern control panel. Care should be taken to ensure the spotlights do not create unwanted reflections on the document viewer.
11.7 Audio System

11.7.1 Sound Reinforcement
RMIT has adopted a policy of providing ceiling mounted recessed loud speakers at approximately 2-4 metre centres above the audience area. A DSP audio management device is to be incorporated. Source selection to the amplifier input is to be controlled by the AMX system.

11.7.2 Program Sound System
A stereo power amplifier driving two to four front of house loud speakers which are to be located at the top corners of the teaching end of the teaching space and the middle of the main seating area. These speakers are required for the amplification of program audio. The amplifiers are to be located in the audio visual equipment rack.

11.8 Hearing Aid Loops
All new AV-3 and AV-4 teaching spaces require hearing aid loops. AV-1 and AV-2 shall be considered based on suitability for such a device. The loop shall encompass a minimum of the front three rows of seats in a lecture theatre or teaching space.

11.9 Video Cassette and DVD Playback
Video tape replay (VHS with PAL/NTSC capability) and DVD is to be provided by way of a DVD/VCR mounted in the lectern at the front of the teaching space and secured to a 2RU shelf. The composite video signal should be used per the appropriate AV standard schematic.

11.9.1 Video Conferencing
RMIT uses a centrally controlled remote management system for Videoconferencing facilities. These facilities enable bookings to be completed for either one-of lectures or a series of events throughout the year. Our system enables remote teaching delivery systems and interactive student collaboration, in addition to contact with other Universities across the world. Our standard touch screen systems have been designed to offer a cohesive user experience at all venues.

Our Videoconference systems use a standard of TANDBERG Edge 95MXP systems. They are configured to use the TANDBERG Content Server. Venue based controls for camera positions and switching inputs are controlled through an AMX touch screen. Installed systems utilize 50” LCD Screens that run at 1920x1080 pixels (1080i standard). The videoconference systems are available in either a trolley or wall mounted configuration to meet user requirements. Detailed specification can be obtained by contacting the Audio Visual Services department.

11.10 Computer
An RMIT PC will be supplied and fitted where required. It is not the vendors responsibility to fit or commission IT equipment in teaching spaces.
11.11 DOCUMENT CAMERA AND OHP
An ELMO P30s document camera is to be located on the lectern and controlled by the AMX touch screen.

11.12 AV EQUIPMENT RACK
An AV equipment rack is to be supplied to contain all the equipment such as the AMX control system, patch panels, control and amplification systems, etc. All mains cables are to be terminated at this location. All cables from the teaching space will be suitably ducted with sufficient access for maintenance and will be clearly labelled. Balanced microphone lines and unbalanced line level connections will be separated and clearly marked. The rack will be lockable by a system that firmly secures it to the concrete floor preventing access to the back. All patch connections and controls will be professionally labelled. A rack mounted storage tray will be provided for the radio microphone and the remote control. The remote control radio receiver will be hidden in the ceiling space or some other secure area. All unused rack spaces will be covered. Perforated metal security covers to prevent tampering will cover all non-user controls.

The AV rack should be:

- Fully populated and any spaces filled with blank panels;
- Fitted with compliant security screws;
- Cabled to allow service of devices from behind;
- All cables should have appropriate service loops;
- Tie bars should be used for cable support;
- Power, video, audio cable segregation;
- 100-150mm cables trays to sides of rack;
- All screw fittings except security screws should be a hex head (Allan Key).

11.13 SECURITY
Major items such as LCD screens, data projector, document camera, AMX control panels and speakers must be secured against theft using an adequate system of restraining devices in accordance with current RMIT procedures.

11.14 DOCUMENTATION
Two copies of a comprehensive operational manual are to be provided in digital format on DVD, which includes a main directory folder named based on location, e.g. 12.03.19 would refer to: Building 12, level 3, room 19. Sub directory folders shall then be named based on the documents that are contained within them.

Documents should be provided in Word, PDF, CAD or associated manufacturer format (e.g. for AMX code).

For each individual or location independent AV installation the following information shall be provided on DVD as outlined above:

- Detailed instructions on how to operate the system;
• Quick start guide, one page maximum;
• Complete with diagrams of:
  • Control system Video connections
  • Video connections
  • Audio connections
  • Rack equipment layout
• Detailed drawings of custom made components, patch bays and connection panels;
• As built drawings if different in any way from the approved drawings at specification stage;
• A list of Make, Model and Serial Numbers of all equipment provided in an excel document.

All original operational, service manuals and warrantee cards/documents will be supplied for each item purchased. These should be gathered together in a named folder, hole punched or in clear slips.

11.15 DEVICE ACCESSORIES

All accessories included with equipment purchases but not installed or used shall be provided in a box or appropriate container clearly labelled with the project title and/or location.

11.16 CONTROL SYSTEM

All standardized teaching spaces will have AMX control systems and be programmed by RMIT approved programmers to specification.

11.17 CABLE TYPES & INTERCONNECTION

All AV cables used shall be of professional make.

The following brands are approved. Non-compliant cable brands must be approved prior to installation.

1. Canare
2. Belden
3. Hartland
4. Mogami

Speaker wire shall be double insulated, striped, multi strand and 2mm squared minimum.

No pre made patch cables shall be used in racks other than for VGA & DVI video sources.
11.18 FIRMWARE
All AV devices shall be provided with current versions of firmware or applicable software. It is the vendor’s responsibility to obtain and load any firmware/software on site to devices found not to be current at the date of handover to RMIT.

11.19 VARIATIONS AND NON-COMPLIANT ITEMS
Any project variations or non-compliant devices must be approved by and document to the AV Services Manager.

11.20 DECOMMISSIONING
All redundant cable must be removed and disposed of and all decommissioned equipment stays the property of RMIT and must be returned to the AV Services department.

11.21 HANDOVER
Integrated AV works will not be considered complete until the “Handover Approval Form” has been signed by both the vendor and an RMIT AV services representative. Please refer to this form included at the rear of this section as Appendix 11.A.

11.22 APPENDICES
Refer to the following Appendices’ for detail of typical design.
- Appendix 11.A – Handover Approval Form
- Appendix 11.B – AV 4 standard AV system diagram
- Appendix 11.D – AV 3 standard AV system diagram
- Appendix 11.E – AV 2 standard AV system diagram
- Appendix 11.F – AV 1 standard Av system diagram
- Appendix 11.G – Video conferencing system guide
- Appendix 11.H – Rack patch plate diagram
- Appendix 11.I – AV input plate guide
- Appendix 11.K – standard lectern design and equipment layout
APPENDIX 11.A: HANDOVER APPROVAL FORM

Project Title:

Project Number:

Project Location:

RMIT PS/ITS Project Manager:

Description:

Date of Handover:

Practical completion will be approved and the installation handed over to RMIT Audio Visual Services only after the vendor/contractor implements the following requirements:

1. The integrated AV System has been delivered as quoted, inspected by the Vendor Project Manager and a RMIT Audio Visual Services representative. Any modifications have been documented by the vendor and approved by RMIT AV Services
2. All equipment has been tested, commissioned and is completely operational
3. All documentation and any decommissioned equipment has been provided
4. All AMX or other control system programming source code have been provided
5. All device accessories have been provided
6. All electrical equipment has been tested and tagged
7. Any training associated with the project has been provided
8. Any keys associated with the AV system equipment have been provided
9. All sway and debris has been removed from site and the area is clean and tidy
10. All conditions set out in the AV Section of the Design Brief have been met or approved as non-compliant.

APPROVAL OF PROJECT COMPLETION (Copy to be provided to vendor)

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APPENDIX 11.B: AUDIO VISUAL SCHEMATICS